

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Reid, Jonathan D.; Taatjes, Steven W.; Contolini, Robert J.;
Patton, Evan E.

Assignee: Novellus Systems, Inc.

Title: ELECTROPLATING PROCESS CHAMBER AND METHOD WITH
PRE-WETTING AND RINSING CAPABILITY

Serial No.: Unknown Filed: Herewith

Examiner: Unknown Group Art Unit: Unknown

Docket No.: M-5593-2C US

San Jose, California
April 9, 2001

BOX PATENT APPLICATION
ASSISTANT COMMISSIONER FOR PATENTS
Washington, D. C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

Please amend this application as follows.

IN THE SPECIFICATION

Please add the following paragraph at the beginning of this application:

This application is a continuation of Application No. 09/374,253, filed August 13, 1999, now U.S. Patent No. 6,214,193, which is a divisional of Application No. 09/096,015, filed June 10, 1998, now U.S. Patent No. 6,099,702.

IN THE CLAIMS

Please cancel Claims 1-16 and add the following new claims.

17. (New) An electroplating process unit comprising:
a plating bath container;
a wafer holder;

an actuator coupled to said wafer holder, said actuator being capable of rotating said wafer holder about a vertical axis and of moving said wafer holder upward and downward along said vertical axis;

an annular recirculation inlet located at a first level above said plating bath container, said annular recirculation inlet being in flow communication with a pump for recirculating a fluid to said plating bath container; and

an annular waste inlet located at a second level above said plating bath container, said annular waste inlet being in flow communication with a waste drain.

18. (New) The electroplating process unit of Claim 17 wherein said annular recirculation inlet has a first diameter that is smaller than a second diameter of said annular waste inlet.

19. (New) A method of using the electroplating process unit of Claim 17 comprising:

positioning a wafer in said wafer holder;

introducing a plating solution into said plating bath container;

immersing said wafer in said plating solution;

using said actuator to move said wafer holder to a first position above said solution;

while said wafer holder is in said first position, spraying a first volume of rinse solution against said wafer and rotating said wafer at a rate such that substantially all of said first volume of rinse solution enters said annular recirculation inlet; and

using said actuator to move said wafer holder to a second position above said solution; and

while said wafer holder is in said second position, spraying a second volume of rinse solution against said wafer such that substantially all of said second volume of rinse solution enters said annular waste inlet.

20. (New) The method of Claim 19 wherein said first volume of rinse solution is smaller than said second volume of rinse solution.

21. (New) A method of electroplating a semiconductor wafer using an electroplating process unit, the electroplating process unit comprising:

a plating bath container;

a wafer holder;

an actuator coupled to said wafer holder, said actuator being capable of rotating said wafer holder about a vertical axis and of moving said wafer holder upward and downward along said vertical axis; and

an annular waste inlet located at a level above said plating bath container, said annular waste inlet being in flow communication with a waste drain;
said method comprising:

positioning a wafer in said wafer holder;

introducing a plating solution into said plating bath container;

using said actuator to move said wafer holder to a first position above said plating solution;

while said wafer is in said first position, pre-wetting said wafer by spraying a first volume of rinse solution against said wafer and rotating said wafer at a rate such that substantially all of said first volume of rinse solution enters said annular waste inlet; and

after said pre-wetting, immersing said wafer in said plating solution.

22. (New) The method of Claim 21 wherein said electroplating unit further comprises an annular recirculation inlet located at a second level above said plating bath container, said annular recirculation inlet being in flow communication with a pump for recirculating a fluid to said plating bath container, said method comprising:

after said immersing, using said actuator to move said wafer holder to a second position above said plating solution; and

while said wafer is in said second position, spraying a second volume of rinse solution against said wafer while and rotating said wafer at a rate such that substantially all of said second volume of rinse solution enters said annular recirculation inlet.

23. (New) The method of Claim 22 comprising:

after said spraying said second volume of rinse solution, using said actuator to move said wafer holder to said first position; and

while said wafer is in said first position, spraying a third volume of rinse solution against said wafer and rotating said wafer at a rate such that substantially all of said third volume of rinse solution enters said annular waste inlet.

24. (New) The method of Claim 23 wherein said second volume of rinse solution is smaller than said third volume of rinse solution.

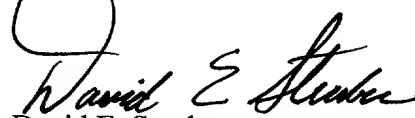
REMARKS

Claims 1-16 have been canceled, and new Claims 17-24 have been added.

EXPRESS MAIL LABEL NO.

EL 710 206 326 US

Respectfully submitted,



David E. Steuber
Attorney for Applicant(s)
Reg. No. 25,557